Technical Report 1193

# The Relation Between Sociometric Choices and Group Cohesion

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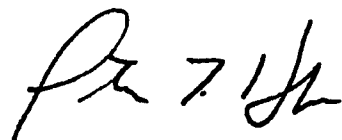U.S. Army Research Institute
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**14. ABSTRACT** *(Maximum 200 words)*:
This research examined the relations between sociometric choices and group cohesion. Data were collected from records and by survey and sociometric questionnaires given to 537 group members in 47 squads near the end of their 6 to 12 months of conscript training in Finland. Results showed moderate, significant correlations between the number of sociometric choices received and perceived cohesion such that Soldiers who were more often chosen as a friend or a combat partner felt that there was more cohesion in their group. Also, Soldiers who received more sociometric choices had higher expected personal and group performance, better performance as rated by their instructors, more positive attitudes toward military service and future refresher training, greater well-being during conscript service, and fewer exemptions from duty during their service. Groups where Soldiers made more in-group sociometric choices were also more cohesive based on questionnaire measures of cohesion. Overall, the findings suggest that sociometric individual choices and group level sociometric cohesiveness are related modestly but positively to questionnaire-based cohesion measures and a wide range of criteria covering performance, attitudinal, and behavioral outcomes.

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# The Relation Between Sociometric Choices and Group Cohesion

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**November 2006**

# THE RELATION BETWEEN SOCIOMETRIC CHOICES AND GROUP COHESION

## EXECUTIVE SUMMARY

### Research Requirement:

Because of the difficulties and limitations of using sociometry, previous research has used either sociometric choices or questionnaire-based scales to measure cohesion but not both. The purpose of the current effort was to try to fill that gap by using both methods and to determine how sociometric choices are (or are not) related to group cohesion measured by questionnaire-based scales. Also, there was a need for analyses to consider the impact of background information and examine the relation of sociometric cohesion to different outcome criteria including attitudes, performance, and behavior. Additionally, analysis needed to establish the relations among the sociometric and other variables at both the individual and group level.

### Procedure:

Two Finnish language questionnaires developed by the author were administered to 537 Finnish military conscripts from 47 squads in 21 platoons near the end of their conscript training period. Most of the questionnaire items concerned opinions and attitudes and were responded to by using a 5-point Likert scale. Also, background information was collected about the conscripts' educational background and mental and physical aptitude. At the end of service, rank, period of service, the number of doctor appointments, the number of medical exemptions from training, and socio-economical data were also obtained through questionnaires and administrative records.

Besides these questionnaires, respondents made sociometric choices by answering the following questions: 1) Who are your best friends in your platoon? 2) In a combat situation (war), whom would you choose as your fighting partner from your platoon? 3) In a combat situation, which six persons would you choose to be in your squad? and 4) In a combat situation (war), whom would you choose as your squad leader, if no official leader has been named? These sociometric choices were transformed into two main types of measures: individual choice status and sociometric group cohesion.

### Findings:

With respect to individual choice status (i.e., the relative number of times an individual was chosen), there were high correlations between being chosen as a friend, fighting partner, or combat squad member ($r$'s = .71 to .78) but only modest correlations with being chosen as a squad leader ($r$'s = .33 to .41). In terms of cross-method validity,

the correlation between perceived peer cohesion measured by a questionnaire scale of items and the pooled sociometric choice status (over the four different choice statuses) was also modest, with an $r = .31$. In a similar vein, the correlation between individual pooled choice status and average individual performance ratings by the training instructors was a modest $r = .20$. Likewise, the correlation between individual pooled choice status and the questionnaire measure of conscript-expected personal performance in combat was $r = .13$.

Five variables were incorporated into a model to explain the variance in pooled individual choice status. The variables, together explaining 17% of the variance, were: peer bonding ($\beta = .35$), performance ratings by the instructors ($\beta = .20$), having friends in the group ($\beta = .12$), perceived bonding with the instructors ($\beta = -.19$), and organizational bonding ($\beta = -.23$). This model suggests that in the Finnish conscript service, those who are close to their primary group but maintain a distance from their formal, larger organization have higher popularity and choice status in their platoon. This effect may have dampened the inter-correlations among sociometric and questionnaire variables.

At the group level, sociometric peer bonding, based on the relative number of in-group vs. out-group sociometric choices, was correlated at $r = .32$ with the group average questionnaire measure of perceived peer bonding. Similarly, the group level sociometric measure of leader bonding was correlated at $r = .31$ with the group average questionnaire measure of perceived leader bonding. The group level sociometric measure of peer bonding was not related to rated or expected performance, but the group level sociometric measure of leader bonding was correlated at $r = .32$ with the group average performance rating by the instructors and at $r = .29$ with expected group performance.

Utilization and Dissemination of Findings:

Sociometry can be used as a method for estimating the quality of group dynamics in a squad or a platoon. Generally, the findings in this report suggest that sociometry is a useful method for studying individual level social reality and indicating members' social status in their group and also for an examination of group dynamics at the group level of analysis. Overall, sociometry's main asset is that it allows gathering quantitative information about the informal structure of a group that is difficult to reach in other ways, and this information could be used for reorganizing groups to support communication and better working relationships.

The description of sociometric choices in training units of the Finnish Defence Forces and the determination of the main kinds of variables, including their relative strength, that affect those choices will increase the understanding of cohesion and group structure in the conscript service and be of use in further designing programs to enhance cohesion and improve leadership. The U.S. Army will be able to use the research results to an extent as validation of its typical questionnaire-based measures of cohesion. Additionally, the increased understanding of the processes impacting on sociometric choices may help further refine models of small group cohesion.

THE RELATION BETWEEN SOCIOMETRIC CHOICES AND GROUP COHESION

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# The Relation Between Sociometric Choices and Group Cohesion

In early days of cohesion studies, cohesion was mainly measured and determined by sociometric choices in groups (Back, 1951; Festinger, 1950; Festinger, Schachter, & Back, 1950; Schachter, 1951). However during last three decades, cohesion has been conceptualized and examined utilizing questionnaire based measures (e.g., Carron, 1982; Gal, 1986; Griffith, 1988; Siebold & Kelly, 1988), and sociometry has been purposely or unintentionally ignored in research designs. One reason for the decline of sociometry and ascent of survey questionnaires might be that sociometry can only obtain a relatively limited array of data. Specifically, sociometry provides data on a person's companions without direct information about his or her attitudes, behavior, or abilities which are usually easy to find using survey data. Another possible reason why sociometry has seen little use over the last decades is that it needs a great deal of effort to combine sociometric choice data with survey data or with interviews. Without this combination of data, sociometry falls short in modern day science where research addresses inter-related and multi-causal phenomenon.

Because of the difficulties and limitations of using sociometry, previous research has used either sociometric choices or questionnaire-based scales to measure cohesion but not both. The purpose of the current effort was to try to fill that gap by using both methods and to determine how sociometric choices are (or are not) related to group cohesion measured by questionnaire-based scales. Additionally, the analyses considered the impact of some background information and examined the impact of cohesion on different outcome criteria including attitudes, performance, and behavior. Different sources of information were utilized and analyzed at the individual and group level.

## Sociometry and Group Cohesion

### The Start of Sociometry and Cohesion Research

Shils and Janowitz (1948) and Festinger, Schachter, and Back (1950) laid the foundation for modern research on cohesion. The latter study, which directly examined group standards and cohesion, also established one of the early definitions of cohesion: "the total field of forces which act on members to remain in the group" (Festinger et al., 1950, p. 164), or another way of saying it: "the resultant of all the forces acting on the members to remain in the group" (Festinger, 1950, p. 274). Festinger and his colleagues proposed that cohesion depends on the attractiveness of the group, but they did not equate cohesion with only the emotional or affective side of attraction. Instead, they presumed that the forces of group attractiveness resulting in cohesion came from three sources: 1) the prestige of the group, 2) the members, and 3) their activities (Back, 1951). The prestige attached to belonging to the group could be seen as related to the concept of social identity (Hogg, 1992). The liking of group members (e.g., peers and leaders) can be argued to be a major component of the social-emotional side of cohesion (Hare, 1962), and the "*possibility of getting a reward for performance in the group activity*" (Festinger, 1950, p. 274) may bear on task cohesion and attainment of group goals. Therefore, the field-of-forces definition was more complex than simple attraction to the group, as some assumed.

The "culprit" for the over-simplified interpretation of Festinger and his colleagues' early definition of cohesiveness may lie in the method used in their studies. Since the main measure used to estimate the cohesiveness of the group was sociometric choices among people, only one of the field-of-forces was examined (i.e., liking of group members), and therefore cohesion was operationally reduced to the mean attractiveness of members. Especially, Gross and Martin (1952) criticized the (Westgate) study for including only one measure of forces that act on group members (i.e., in-out group ratio of friendships).

Later studies articulated the way military cohesion is usually conceptualized nowadays. The work of the U.S. Army Research Institute for the Behavioral and Social Sciences (e.g., Siebold & Kelly, 1988), Walter Reed Army Institute of Research (e.g., Griffith, 1988), sport research on cohesion (e.g., Carron, 1982), task cohesion research (e.g., Zaccaro, 1981), and Israeli researchers (e.g., Gal, 1986) have conceptualized cohesion as having social and task-related components. Currently the generally accepted structure of military group cohesion contains horizontal (peer), vertical (leader), and organizational bonding in a group where each has affective (social-emotional related) and instrumental (task related) dimensions (Griffith, 1988; Siebold & Kelly, 1988). In this report, military group cohesion is considered to be the bonding (i.e., positive social relationships, including both affective and instrumental aspects) among the service members and with their leaders in their primary group and with their immediate larger organization and with their branch of service at the institutional level. Cohesiveness is the extent of that bonding among peers, with leaders, with immediately higher organizational levels, and with the military institution. The main difference between this approach compared to previous cohesion conceptualizations is that institutional bonding (i.e., commitment to the military service) is incorporated into the earlier created models (e.g., Salo & Siebold, 2005). While conceptualization of the construct of cohesion has improved, sociometric techniques did not change much. Thus survey questionnaires displaced sociometry as the primary method of collecting data on group cohesion. Nevertheless, sociometry never tried to be more than it was planned for. It was and still is a simple, illustrative way to study interpersonal attractions among people in a group.

*Sociometry as the Study and Measurement of Social Choice*

Sociometry was created by Moreno (1934) and utilized extensively during the 1940's, 50's and 60's for practical purposes at schools and work settings and also for research purposes to examine social interrelations and communication in groups. Sociometry could be defined as *"the study and measurement of social choice"* (Kerlinger, 1986, p. 499). Through sociometry, a researcher is able to study the psychological properties of groups (Moreno 1934), uncover the feelings and perceptions which individuals have regarding one another, and examine the structure of interactions between members of the formal or informal group (Jennings, 1977; Secord & Backman, 1964). In sociometry, interpersonal relations are measured by asking group members to express their preferences for particular companions in a certain situation or activity, like "Whom would you choose to work with?" (Festinger et al., 1950; Moreno, 1934; Northway & Weld, 1957). The typical choice is normally related to friendship or companionship at work. Since different choice criteria influence the content of interaction (Hare, 1962) and also the obtained sociometric choices (Lindzey & Byrne, 1968), the choice criteria should be decided based on the research question or design.

The sociometric "test" reveals the group (affect) structure (Secord & Backman, 1964) and identifies possible subunits of the group as well as various types of group positions (Jennings, 1977). The sociometric group structure is examined using one or more of three possible tools: sociograms, sociometric matrices, or sociometric indices (Lindzey & Byrne, 1968). In sociograms the choice data are displayed as target diagrams where people are represented as circles and choices are expressed by arrows or different types of lines (Northway, 1940). There are three types of choices: one-way, two-way (i.e., reciprocal), and no choice. People who have received many choices have their circles located at the center of the picture whereas those who have few or no choices have their circles out to the side. Using the drawn sociogram, a researcher can visually analyze the pattern of attraction or rejection and communication paths in a group (Jennings, 1977). There are at least six choice patterns that could be studied in a sociogram: isolated, unchosen, stars (i.e., highly chosen ones), pairs (with mutual attractions/arrows), triangles, and chains (Forsyth & Katz, 1946; Hare, 1962). Generally, sociograms are useful if a study is more qualitative in nature and there are few groups and only a few group members, but *"it is apt to be confusing to the reader, especially if the number of subjects is large"* (Forsyth & Katz 1946, 341).

Due to the limitations of sociograms, the matrix approach was proposed by Forsyth and Katz (1946). A directed graph (i.e., sociogram) and a matrix display the same thing, just in a different way. However, matrices can easily display the data for studies of large groups (larger than 20 people) and for more in-depth analytic studies (Kerlinger, 1986). In the matrix, group members are listed in the same order in both the row and column headings. For a given row (with a person's name), one can find whom that person chose among the members of the group (shown in the column headings), with choices indicated by the number 1 or the mark $x$. For a given column (with a person's name), one can find who chose that person (i.e., the column corresponds to the person receiving the choice; Festinger et al., 1950). The number of times a person was chosen is found out by adding his or her column of the matrix (Kerlinger, 1986), with all the column sums used to calculate different indices.

*Sociometric Choice Status*

People observe and evaluate others and make conclusions about other group members' behavior during social relations in informal and formal settings (Kerlinger, 1986). Sociometric choices are one means to reveal these assessments. The matrix approach enables the calculation of personal choice status by using the formula $CS_x = \sum c_x / (n - 1)$ where $CS_x$ is the choice status of person $x$; $\sum c_x$ is the sum of choices in Column $x$; and n is the number of individuals in the group (n – 1 is used since the person is not allowed to choose himself) (Proctor & Loomis, 1951, p. 571). Generally, sociometric choice status indicates the degree to which the person is accepted by other members of the group (Northway & Weld, 1957).

People almost always have some preferences for their companions in their group (Northway & Weld, 1957; Tagiuri, 1958), and certain people usually receive more choices than others (Hare, 1962). In sociometry, people who receive many choices are referred to as sociometric stars (Forsyth & Katz, 1946; Secord & Backman, 1964). French and Mensh (1948) argued that these popular people are more likely to represent the group ideal or valued norms; therefore they receive more selections. Jennings (1950, 1977) proposed that the more frequently

selected people help, protect, and provide emotional satisfaction to group members more than others do. Those with high-choice status in their group also may have some other favorable characteristics from an organization point of view since high status in a group has been related to productivity and the performance of a member (Hare, 1962). It has been also suggested that highly selected people are at the same time (informal) leaders of the group (Jennings, 1950; Lindzey & Byrne, 1968).

Overall, past research has related sociometric selections to a) propinquity, b) compatible norms and values with the group, c) socially valued traits, d) similarity of attitudes and social background between members, e) social adjustment of the individual to the group life, and f) the abilities (e.g., intelligence and performance) of the person (Festinger, 1950, 1954; Festinger et al., 1950; French & Mensh, 1948; Lindzey & Byrne, 1968; Lott & Lott, 1965; Newcomb, 1943, 1961; Thibaut & Kelley, 1959). Whatever the reason for higher choice status in a group, the more frequent selection rate indicates a better social potential of the person relative to other group members. Perhaps even more interesting is how social choice differences in a group point out the different roles that are occupied in the group (Northway & Weld, 1957).

In addition to indicating the highly-chosen people, the sociometric test identifies the people who are left out of people's social preferences (Northway & Weld, 1957; Tagiuri, 1958). The unchosen people are usually considered to be (sociometrically) more or less indifferent as group members (not liked or hated). Festinger et al. (1950), who devoted a chapter on examining socially isolated people in the Westgate housing program, found that the less a person received choices the more likely he or she was a deviate of the group, who were seen to be different from the others in the group. These deviate people were not chosen as much in a larger group either. It was assumed that sociometric isolation is both a cause and an effect of being deviate.

There are at least three general reasons for isolation in a group. The first one is psychological, related to personal factors of the deviate, in which the person is so different from the others in terms of personal characteristics or attitudes that the other group members avoid or reject being associated with him or her (cf. Hare, 1962). The second reason for isolation is social psychological in nature. Based on exchange theory (e.g., Thibaut & Kelley, 1959), the deviate may have compared the rewards and costs of being a member of the group and decided to avoid active group membership. Festinger et al. (1950) suggested some reasons as to why the deviate is able to resist integration into the group: a) the group is not sufficiently attractive to the member, b) there is not enough communication between the deviate and other group members, and c) there is another group in which membership is more important for the deviate. The third reason for isolation is due to the structure and activities followed in the group. A large amount of isolation in a group may indicate that the group is not well organized or developed in optimal way (Northway & Weld, 1957).

One special type of isolation is a clique within a group which may be extremely cohesive itself but have few ties with the group as a whole. Festinger et al. (1950, p. 144) located cliques where "*three or more individuals*" mutually chose each other. They noted that a clique which includes only a few members decreased the overall cohesiveness of the group, whereas larger cliques were not as damaging to cohesion. However, as the size of the group increases, the group is more likely to be divided into parts (cliques) (Hare, 1962).

*Sociometric Choices, Cohesion, and Performance*

Sociometric choices have been linked with the (affective) cohesiveness of the group since Festinger et al. (1950). Researchers who thought of cohesion mostly in terms of inter-personal attraction, and that a person will be more attracted to a group where there are people he or she likes, have been prone to use sociometric choices to assess cohesion. Thus, one of the early propositions was that cohesion could be measured based on the "number and strength of mutual positive attitudes among the members of a group" (Lott & Lott, 1965, p. 259). Fortunately, researchers in the 1980's improved on the earlier interpretation. Now cohesion is generally considered to be a group level property that is more than a unitary construct based only on affective bonding (i.e., interpersonal attraction, liking, or positive attitudes among group members) (e.g., Griffith, 1988; Siebold & Kelly, 1988). Nonetheless, while at the individual level sociometric choice status reveals more about a person than the group, at the group level sociometry permits conclusions about a) group structure, b) the functioning of social relations, and c) the level of the group integration (i.e., the cohesiveness of the group) (cf. Northway & Weld, 1957).

The (group level) sociometric cohesion index is based on the assumption that the greater the proportion of in-group choices to out-group or "no" choices the higher will be the cohesiveness of the group (Gross & Martin, 1952). A typical sociometric formula focuses on mutual choices in a group, although the proportion of in-group choices could also be calculated based on one-way selections. Thus, one sociometric measure of group cohesiveness is $S_{Coh} = \sum(i \leftrightarrow j) / [n(n-1)/2]$ (Bjerstedt 1963, p. 53; Proctor & Loomis, 1951, p. 572) where $\sum(i \leftrightarrow j)$ is sum of mutual choices (or mutual pairs) and n is group size. This index is the proportion of mutual choices to the total number of possible pairs in a group. This kind of measure indicates the level of social identification within the group and the members' willingness to being involved in it (Cartwright, 1968). More about sociometric indices can be found in Lindzey and Byrne (1968) and Proctor and Loomis (1951).

Overall, it has been found that these ingroup choices are positively related to performance (Goodacre, 1951), particularly when the norms of the group are favorable to high performance or the production rate (Hare, 1962) or when there is a positive "drive" in a group (Stogdill, 1972). Seashore (1954), who showed the importance of productivity norms, also noticed that there was less variation in productivity in the sociometric high-cohesion groups, although he did not support the direct effect of cohesion on performance.

*Working Hypotheses*

The literature suggests that, at the individual level, people choose others as friends if they expect them to perform well and that, at the group level, measures of sociometry and group cohesion should be related. Therefore this analysis examined if a) status choices are positively related to perceived cohesion and performance in platoons, and if b) sociometric group cohesion is positively related to group level peer bonding and performance.

Method

*Sample*

All respondents were Finnish conscripts who served their compulsory six to twelve months military service in an armored brigade in south-central Finland. The sample consisted of 537 conscripts from 47 squads in 21 platoons in seven different types of units; 366 of these conscripts (68.2 % of respondents) participated in all "tests." Platoons in this analysis represented different a) types of units (combat, combat support, and support units), b) branches in military (armored, mechanized infantry, infantry, engineer, and anti-aircraft units), c) training programs, d) size, and e) group structure. Squad membership was determined based on different lists of groupings: the formal groups (for the task) and the accommodation lists in barracks. Since the barrack rooms accommodated one squad per room and a barrack room list was highly related to actual squad membership, the barrack lists were used as the primary means of grouping sociometric data; other group lists were used as secondary means if data indicated that the first option was not valid (e.g., people chose friends from a neighbor barrack room who were part of a larger training group).

Ninety-two percent of the conscripts were 19-20 years old, 2 percent were 18 year olds, and 6 percent were 21-28 year olds. Seven conscripts were female volunteers. All were White. At the end of conscript service, 55 percent of conscripts were still privates, 35 percent were lance corporals or corporals, six percent were sergeants, and four percent of conscripts had been promoted to serve as a platoon leader. The period of service, which depended on the training received, for 45 percent of the conscripts was six months, for five percent it was nine months, and for 50 percent it was twelve months. After completing their 6 to 12 months conscript training, Soldiers were released from active duty and assigned to the reserves.

*Questionnaire Administration*

Two Finnish language questionnaires developed by the author were administered near the end of the conscript training period. Most of the questionnaire items concerned opinions and attitudes and were responded to by using a 5-point Likert scale. Prior to or during the service, background information was collected about the conscripts' educational background and mental and physical aptitude. At the end of service, rank, period of service, the number of doctor appointments, the number of medical exemptions from training, and socio-economical data were also obtained through questionnaires and records.

Besides these questionnaires, respondents made sociometric choices by answering the following questions: 1) Who are your best friends in your platoon (one to three)? 2) In a combat situation (war), whom would you choose as your fighting partner from your platoon? 3) In a combat situation, which six persons would you choose to be in your squad? and 4) In a combat situation (war), whom would you choose as your squad leader, if no official leader has been named? These sociometric choices were transferred to two main types of measures: choice status and sociometric group cohesion.

*Measures*

In this research, the choice status refers to the extent of which a person was chosen to be a friend, a fighter, a group member, or a leader (proportional to the group size). For instance, the fighter status of a member was determined by using the formula $CS_{fighter\_1} = \sum c_{fighter\_1} / (n-1)$ where $CS_{fighter\_1}$ is the choice status of the first person in a squad; $\sum c_{fighter\_1}$ is the column sum of the number of times the person was chosen as a fighting partner; and n is the number of individuals in the platoon. Since the platoon was a meaningful reference group for conscripts (sometimes even more so than a squad) and because of the large number of different squads in the data, the number of people in a platoon was used as the base in a formula. Later, different formulas were compared, and the platoon $n$ turned out to be the best grouping. Thus, the measure of choice status indicated the status of a person in a platoon, not a squad, although these two were highly related in each question ($r$'s = .65 - .72, $p$ < .001).

A given person's choice status varied depending on what the respondents were being asked to choose (friend, fighter, group member, or leader). Thus, to form a measure of the average choice status of the person in a group, all four choice status indices were also pooled together. This provided one summary measure of choice status that could simplify further analyses. This pooling was done in previous research (e.g., Jennings, 1950), and the scale properties for the pooled choice status were reasonable (e.g., $\alpha$ = .81).

Sociometric group cohesion was measured based on ingroup versus outgroup choices (as numbers and percentages). One-way choices were utilized rather than mutual choices, because mutual choices indicate reciprocated friendship and a cohesion index made by them might be measuring mostly the individual level friendship in a group. Since cohesion refers to a group property which makes people remain in a group (Festinger et al., 1950), resist disruptive and disintegrative forces, (Gross & Martin, 1952; Shils & Janowitz, 1948), and create social identity as a group member (Hogg, 1992), the sociometric group cohesion index should measure the group as a whole without focusing essentially on friendship in a group (Cartwright, 1968). Therefore in this report, the sociometric group cohesion indicates how many sociometric (one-way) choices were targeted to their own group versus other groups (Secord and Backman, 1964). The measure of the sociometric group cohesion used was $S_{Coh} = \sum(ingroup) / [n(n-1)]$, where $\sum(ingroup)$ is the sum of the ingroup choices.

Based on the cohesion literature and factor analyses of responses to the questionnaires, scales measuring the main constructs of interest were developed. Specifically, in the factor analysis, items whose responses loaded strongly (e.g., >.40) on the same factor were utilized as measures of over-arching constructs. The level of cohesion was determined for four types of bonding: a) peer, b) leader, c) organizational, and d) institutional (see Table 1). Every bonding level, although conceptually distinct, was considered to be partially related to each other, so that the strength of one type of bonding is associated with the strength in the other components. The primary group cohesion, peer and leader bonding, scales included perceptions about both affective and instrumental aspects of bonding. Leader bonding included items about the closest

Table 1
*Sociometric Indices, Peer Group Cohesion Scales, and Some Other Measures (n = 366)*

**I     Sociometric Indices**

A. Sociometric Choice Status of the Person [CS = $\sum$person's choices / (n – 1)]
1. Who are your best friends in your platoon (one or more)? Choose from your own squad or the whole platoon.        $M(\%)$ = 10.8; $SD$ = 11.2
2. 2. In a combat situation (war), whom would you choose as your fighting partner from your platoon?        $M(\%)$ = 8.9; $SD$ = 12.9
3. In a combat situation, which six persons would you choose to be in your squad? Choose from your own squad or the whole platoon.     $M(\%)$ = 22.7; $SD$ = 21.7
4. In a combat situation (war), whom would you choose as your squad leader, if no official leader has been named?        $M(\%)$ = 4.1; $SD$ = 10.6
5. Pooled Choice Status in Platoon (questions 1 – 4)
   - $\alpha$ = .81; item-total $r$ range = .41 - .82; $M(\%)$ = 11.6; $SD$ = 11.8

B. Sociometric Peer and Leader Cohesion in a Group

[$S_{Coh}$ = $\sum$(ingroup choices) / n(n – 1)]

→ Sociometric Peer Bonding Index = Summed $S_{Coh}$ of questions 1, 2, and 3
   - $\alpha$ = .86; item-total $r$ range = .69 - .77; $M(\%)$ = 30.9; $SD$ = 17.5; $n$ = 47

→ Sociometric Leader Bonding = $S_{Coh}$ (question 4)
   - $M(\%)$ = 7.0; $SD$ = 5.5; $n$ = 44

C. Sociometric Status of the Group in the Platoon

[$S_{GroupStatus}$ = [$\sum$(choices towards the group in platoon) / $n_{platoon}(n_{platoon}- 1)$] / $n_{group}$]

→ Sociometric Group Status in the Platoon = summed $S_{GroupStatus}$ of questions 1 to 4
   - $\alpha$ = .83; item-total $r$ range = .64 - .91; $M(\%)$ = 11.0; $SD$ = 6.6; $n$ = 47

**II     Primary Group Cohesion Scales**

A. *Peer Bonding*     $\alpha$ = .83; item-total $r$ range = .48 - .63; $M$ = 3.74; $SD$ = .74
1. In my squad I get help when I need it.
2. I feel appreciated in my squad / barrack room.
3. I can influence decisions made in my barrack room / squad.
4. My squad emphasizes common goals.
5. My current squad has a really good esprit de corps.
6. My platoon has a good esprit de corps.
7. In war my squad members would help me even if it would set them in danger.
8. In case of war, I would like to be in my current squad.

Table 1 (continued)

B. *Leader Bonding*     α = .89; item-total *r* range = .33 - .71; *M* = 3.71; *SD* = .80
1.  I have been getting along well with my closest conscript superior.
2.  My squad leader has dealt fairly and straightforwardly with me.
3.  On the whole my squad leader is a good person.
4.  My squad leader masters his or her duties.
5.  During field practice my squad leader has set an example and tried his hardest.
6.  During a crisis I would like to work with my current squad leader.
7.  My platoon leader has dealt fairly and straightforwardly with me.
8.  During the field practice my platoon leader has set an example and tried his hardest.
9.  On the whole my platoon leader is a good person.
10. My platoon leader masters his or her duties.
11. During a crisis I would like to work with my current (conscript) platoon commander.

## III     Performance Measures
*Instructor Ratings of Performance*     α = .83; item-total *r* = .71; *M* = 3.63; *SD* = .77
1. Wartime field proficiency.
2. Military performance overall estimation.

*Expected Group Performance*     α = .82; item-total *r* = .69; *M* = 3.59; *SD* = 1.01
1. The squad which in belong to would do well in real combat.
2. The platoon that I belong to would do well in real combat.

*Expected Personal Performance*     α = .78; item-total *r* range = .44 - .56; *M* = 3.59; *SD* = .76
1. I have a clear picture of my duty during a war.
2. On the basis of my training I could do my duty during a war.
3. Training has given me the mental skills for battle situations.
4. In every circumstances, I master the weapons and equipment needed for my duty.
5. On the basis of my physical condition I could get through two weeks of battles and three to four days and nights of decisive battles.
6. On the basis of my mental health I could get through two weeks of battles and three to four days and nights of decisive battles.

## IV     Soldiers' Attitudes and Well-Being
*Attitudes towards Training*     α = .66; item-total *r* range = .42 - .53; *M* = 3.66; *SD* = .90

*Mental State*   α = .81; item-total *r* range = .47 - .68; *M* = 4.23; *SD* = .82

*Refresher Training Intentions* (one item) (*M* = 2.66; *SD* = 1.50)

*Number of Doctor's Appointments* (absolute number provided) (*M* = 10.8; *SD* = 8.0)

*Number of Exemptions during the Conscript Service* (*M* = 15.9; *SD* = 14.3)

*Effective Service Days (percent)* (*M* = 91.2; *SD* = 11.3)

conscript leaders (squad and platoon leaders) to the conscript Soldiers. The secondary group cohesion scales measured organizational and institutional bonding. Organizational bonding was assessed by items about unit atmosphere and experiences in the unit during military service (e.g., "The atmosphere in my company is good", "I am proud of my unit"). The institutional bonding scale included items about affective, normative, and continuance commitment to the military (e.g., "I am not interested in military service", "I feel at home in military service"; Salo & Siebold, 2005). Other cohesion and sociometry related scales covered perceptions of sociability, friendship, hazing, training quality and challenges, and adjustment to the military service.

Sociometric and cohesion scales were linked with some criterion scales. Conscripts' perceptions of their own and their group's performance were formed into a two scales: *Expected Personal Performance* and *Expected Group Performance*. Instructor's two ratings of conscript capability for wartime duties were averaged to form an important criterion scale, *Performance Ratings*, which was not biased by the same inquiry method or source of information, the conscript. Attitudes towards the military were assessed using the *Refresher Training Intentions* scale. Soldiers' psychological well-being was examined by the *Mental State* and *Exemptions* scales and using records about doctor appointments.

## Results

### Correlations Between Sociometric Choices

Since people tend to choose the same people for their friends and work partners (Goodacre, 1953; Hare, 1962) and there are also people who have broadly desirable features in both social and task-oriented action (Borgatta, Couch, & Bales, 1954), high correlations were expected between the main sociometric indices. Table 2 confirms this by showing that friendship, fighter, and group member choice statuses were highly related to each other ($r$'s = .7 − .8). The correlations were moderate ($r$'s = .3 − .4) between leader choices and the other choices, suggesting that the leader choice was based on different considerations than the other three choices. These modest correlations may be due to: a) there were only a few who were selected for the (informal) leader in a squad and a platoon whereas peer selections were more equally distributed, b) the chosen ones were more often their formal leaders in a platoon (not necessary their own squad leaders), and c) if they were not formal leaders, still the more chosen were more often promoted in rank to corporals or lance corporals. The relation between leader choices and actual leadership or leader characteristics (e.g., promotions) support the presumption that sociometric choices reveal people who are informal or capable leaders in groups.

### Correlations Between Choice Status and Questionnaire Measures

Correlation levels were low to moderate between different choice statuses and other measures. However, the strongest relations were between the combined (pooled) sociometry choice status and *Peer Bonding* ($r$ = .3) and between the pooled choice status and instructor rated performance ($r$ = .2) (see Table 2), which is consistent with working hypothesis "a." Although, *Peer Bonding* had the lowest correlation with the sociometric *Leader Choice*, the *Leader Choice* status was the only choice status category that correlated with all cohesion components and performance measures. Generally, people who received more choices and had better sociometric

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status in their group a) had better performance ratings, b) perceived more peer bonding in their group, c) were sociable, d) had friends, e) were not hazed, f) had a better mental state, and g) had fewer doctor's appointments and exemptions from duty than their less chosen group members (*p* < .05). Sociometrically chosen leaders felt better bonding with peers and leaders, were bonded with their unit and the military as an institution, had better self-rated and instructors' rated performance, better training motivation, and more positive attitudes towards future refresher training. As those selected as good friends and fighters, those chosen as leaders were sociable, had friends, and experienced less hazing.

Table 2
*Correlations Between Main Measures at the Individual Level*

| Main Indices and Scales | | Friend Choice | Fighter Choice | Group Choice | Leader Choice | Pooled Choice Status |
|---|---|---|---|---|---|---|
| Sociometric Indices | Chosen as a Friend | 1 | .78*** | .71*** | .33*** | .85*** |
| | Chosen as a Fighter | .78*** | 1 | .76*** | .41*** | .90*** |
| | Chosen for the Group | .71*** | .76*** | 1 | .38*** | .92*** |
| | Chosen as a Leader | .33*** | .41*** | .38*** | 1 | .59*** |
| Questionnaire Scales | Peer Bonding | .27*** | .26*** | .28*** | .20*** | .31*** |
| | Leader Bonding | (ns.) | (ns.) | (ns.) | .17*** | (ns.) |
| | Organizational Bonding | (ns.) | (ns.) | (ns.) | .12* | (ns.) |
| | Institutional Bonding | (ns.) | (ns.) | (ns.) | .18*** | (ns.) |
| Performance Criteria | Performance Ratings | .11* | .18*** | .18*** | .20*** | .20*** |
| | Expected Group Perf. | (ns.) | (ns.) | .11* | .13* | (ns.) |
| | Expected Personal Perf. | (ns.) | (ns.) | (ns.) | .21*** | .13* |
| Attitudinal Criteria | Training Motivation | (ns.) | (ns.) | (ns.) | .18*** | (ns.) |
| | Refresher Training | (ns.) | (ns.) | (ns.) | .19*** | (ns.) |
| Social Factors | Sociability | .16** | .11* | .14** | .11* | .16** |
| | Had Friends in a Group | .21*** | .12* | .15** | .15** | .19*** |
| | Was Not Hazed | .14** | .15** | .14** | .11* | .15** |
| Well-Being | Mental State | .11* | (ns.) | .11* | .11* | .12* |
| | Doctor's Appointments | (ns.) | -.12* | -.11* | (ns.) | -.11* |
| | Exemptions at Service | (ns.) | -.11* | -.11* | (ns.) | -.12* |
| | Effective Days | (ns.) | .13* | .14** | (ns.) | .15** |
| Background Factors | Rank | (ns.) | .14** | (ns.) | .48*** | .22*** |
| | Age | (ns.) | (ns.) | -.10* | (ns.) | (ns.) |
| | Gender | (ns.) | (ns.) | (ns.) | (ns.) | (ns.) |
| | Education Level | (ns.) | (ns.) | (ns.) | (ns.) | (ns.) |
| | GPA in School | (ns.) | (ns.) | (ns.) | (ns.) | (ns.) |

*Note. n* = 365. * = *p* < .05; ** = *p* < .01; *** = *p* < .001.

*Leader Choice vs. Other Measures*

Since the leader choices were strongly related ($r = .5$, $p < .001$) to rank, partial correlations were computed between sociometric leader choice status and select criteria with rank controlled. Overall, there were no connections between leader choice status and the criteria measures when the effect of rank was controlled. However, among sergeants the correlation between leader choice status and *Peer Bonding* was $r = .63$ ($p = .05$; $n = 21$). Also, among sergeants and platoon conscript leaders, the sociometrically chosen leaders had better physical health ($r = .4$), were more likely to have friends in the group ($r = .3$), felt bonded with their group ($r = .4$), had better personal performance ($r = .4$), and had significantly lower career intentions ($r = .4$) than other leaders at the same rank ($n = 36$; $p < .05$). The last factor, negative career intentions, refers to a characteristic of the Finnish conscript service system. Since a minority of the male population will be selected to serve as a leader during their conscript service and only few will be selected to serve as an officer, the general attitude or norm at the squad level seems to be against any career intentions in military ($M = 2.1$ on the Likert scale). The main implication based on sociometric leader choices is that Soldiers tend to select already officially tested, selected, and promoted people for their leaders but especially those who are seen as on their side as members of their peer group and in accord with group norms.

*Linear Regression of Sociometric Choice Status*

A linear regression model was developed to explain pooled sociometric choice status based on the questionnaire measures (Table 3). The model showed that the more chosen ones were socially connected with their groups in terms of perceived peer bonding and having friends in the group and had better performance ratings, although at the same time they experienced less bonding with their instructors. Overall, this model indicates that in the Finnish conscript service people who are close to their primary group but maintain a distance from their higher organizational unit are sociometrically more popular in their platoon.

Table 3
*Predictors of Pooled Individual Choice Status in a Platoon*

| | | | | Cumulative Values | |
| Predictor Scales | *r* | *Beta* | Sig. | *R* | Adj. *R²* |
| --- | --- | --- | --- | --- | --- |
| Peer Bonding | .31*** | .35 | .001 | .31 | .10 |
| Instructors | -.13** | -.19 | .001 | .36 | .13 |
| Performance Ratings | .20*** | .20 | .001 | .39 | .15 |
| Organizational Bonding | .05 (ns.) | -.23 | .001 | .42 | .17 |
| Friends | .19*** | .12 | .05 | .43 | .17 |

*Note.* $n = 355$. ** $= p < .01$; *** $= p < .001$. $R = .43$; Adj. $R² = .17$.

*Mean Differences Between High and Low Choice Status Soldiers*

The relations between sociometry and questionnaire based scales were also tested by comparing low and high choice status people in squads. For this comparison, Soldiers were

divided to three equal groups: low, moderate, and high status. The cut points were determined using the pooled choice status index. Specifically, people who had low status in a platoon were selected by less than five percent of members whereas the "high" status people were selected by at least 13 percent (cf.. the cut points suggested by Northway & Weld, 1957). The comparisons using a series of one-way ANOVAs and Scheffe's tests (see Table 4) demonstrated that Soldiers who had low status in their group perceived their peer group cohesion significantly lower than their high status counterparts ($M = 3.5$ vs. $4.1$; $p < .001$). Correspondingly, the rated performance was significantly lower among low status people than among high status Soldiers ($M = 3.5$ vs. $3.8$; $p < .01$).

Table 4
*Mean Differences Between High and Low Choice Status Soldiers*

| | Scales and Variables | Low Choice Status | High Choice Status | Sig. |
|---|---|---|---|---|
| Main Criteria | Peer Bonding | 3.5 | 4.1 | .001 |
| | Performance Ratings | 3.5 | 3.8 | .01 |
| Social Factors | Sociability | 4.2 | 4.4 | .01 |
| | Friends in a Group | 3.5 | 4.0 | .01 |
| | Experienced Hazing | 3.8 | 4.2 | .01 |
| Soldier's Well-Being | Mental State | 4.1 | 4.3 | .05 |
| | Physical Health | 3.9 | 4.4 | .001 |
| | Effective Days in Service (%) | 87.6% | 94.5% | .001 |
| | Number of Doctor's Appointments | 12.6 | 8.6 | .001 |
| | Exemptions at Service | 19.9 | 12.4 | .001 |

*Note.* Low Choice Status $n = 123$, and High Choice Status $n = 117$.

Generally, the findings shown in Tables 2, 3, and 4 supported the first hypothesis ("a") that sociometric choices would be positively related to cohesion and performance. These findings are qualified in that the choice status of the person was mainly related to peer bonding but not with the other cohesion components and that the choice status had little relation to the conscript's self-rated or self-assumed group or personal performance level but was related to performance evaluated by the (external to the group) instructors in companies.

*Sociometric Group Cohesion at the Group Level*

The aggregated questionnaire scale means and standard deviations were computed at the group level for each of the 47 squads in the sample. These measures were contrasted with the sociometric peer and leader cohesion group measures. Table 5 shows that the groups' questionnaire based cohesion measures (i.e., peer and leader bonding) were related to sociometric ingroup choices ($r = .3$, $p < .05$). The longer people were together (i.e., period of service) the better were the levels of sociometric peer and leader cohesion (i.e., there were more ingroup choices based on the sociometric questions). The proportion of the number of times

Soldiers selected people for their leaders who were inside their own group versus outside their group was related to several group-level aggregated measures (see the Soc LB column, Table 5) like primary group cohesion, performance, refresher training attitudes, Soldiers' well-being (mental and physical health), and promotions in a group (i.e., rank).

Table 5

*Correlations Between Main Measures at the Group Level*

| Main Indices and Scales | | Soc PB | Soc LB | PB | LB |
|---|---|---|---|---|---|
| Sociometric Cohesion | Sociometric Peer Bonding | 1 | (ns.) | .32* | (ns.) |
| | Sociometric Leader Bonding | (ns.) | 1 | .33* | .31* |
| Questionnaire Scales | Peer Bonding | .32* | .33* | 1 | .53*** |
| | Leader Bonding | .33* | .31* | .53*** | 1 |
| Performance and Attitude Criteria | Performance Ratings | (ns.) | .32* | .41** | .35* |
| | Expected Group Performance | (ns.) | .29* | .52*** | .52** |
| | Refresher Training Attitudes | (ns.) | .33* | .44** | .59*** |
| Well-Being | Mental State | (ns.) | .35* | .38** | .34* |
| | Physical Health | (ns.) | .33* | (ns.) | .45** |
| Group Structure | Rank | (ns.) | .46** | .31* | .53*** |
| | Period of Service | .34* | .44** | .44** | .39** |

*Note. n* = 47 squads. * = *p* < .05; ** = *p* < .01; *** = *p* < .001. Soc = sociometry measure.

To further examine whether there were positive relations between group level sociometric leader cohesion in squads and the main variables of interest, the questionnaire means of these main variables were examined under conditions of low and high sociometric leader bonding (Table 6). The high sociometric leader cohesion groups had higher self-rated peer, leader, and organizational bonding and also significantly better self-rated and instructors' rated performance. Also, in groups where people did not select their own leaders as much, low sociometric leader bonding, the group members were less sociable, were in poorer physical condition, had more absenteeism (fewer effective service days), and had less positive attitudes about refresher training in future. In short, working hypothesis "b," that sociometric group cohesion should be positively related to group level peer bonding and performance, is supported for sociometric leader bonding and partially for sociometric peer bonding (which was not related to performance in Table 5).

*Isolates in Groups*

Another way of studying different kind of groups based on sociometry is the utilization of the information about isolates (i.e., people who were not chosen). At the individual level, isolates are those who were earlier referred as low choice status people. In this current research, the main focus was not on the individual isolate but in examining group level properties based on the level of isolation in groups. If a group had isolates, the purpose was to find out how groups with isolates differed from integrated groups where everybody had at least one friend. Specifically,

Table 6
*Mean Differences Between High and Low Sociometric Leader Bonding Groups*

| | Scales and Variables | Low Sociometric LB | High Sociometric LB | Sig. |
|---|---|---|---|---|
| Main Variables | Peer Bonding | 3.5 | 3.9 | .01 |
| | Leader Bonding | 3.4 | 3.9 | .001 |
| | Organizational Bonding | 3.3 | 3.6 | .05 |
| | Expected Group Performance | 3.4 | 3.9 | .01 |
| | Performance Ratings | 3.3 | 3.8 | .001 |
| Other Factors | Sociability | 4.2 | 4.4 | .05 |
| | Physical Health | 3.9 | 4.4 | .01 |
| | Effective Days in Service (%) | 88.9% | 93.1% | .05 |
| | Refresher Training Attitudes | 2.2 | 2.8 | .01 |

*Note.* Low Sociometric Leader Bonding $n = 106$ in 15 groups, and High Sociometric Leader Bonding $n = 108$ in 15 groups.

Table 7
*Mean Differences Between Groups with Isolates and Integrated Groups*

| | Scales and Variables | Isolates in Group | Integrated Group | Sig. |
|---|---|---|---|---|
| Sociometry | Chosen as a Friend (# of in-group choices) | 1.7 | 3.2 | .001 |
| | Chosen as a Fighter (# of in-group choices) | 1.4 | 2.1 | .05 |
| | Sociometric Peer Cohesion (%-points in group member choices) | 33.6 | 57.2 | .05 |
| Other items | Had Friends in a Squad (Scale) | 3.5 | 3.8 | .05 |
| | Social and Leadership Skills Test Scores in a Group | 1.7 | 3.6 | .01 |
| | IQ-test Scores in a Group | 4.5 | 5.4 | .05 |
| | Number of Group Members | 8.0 | 6.1 | .05 |

*Note.* For groups with isolates, $n = 10$; for integrated groups, $n = 12$.

two categories of groups were used based on the number of isolates. The first category consisted of groups with one third or more of the group who were isolates; the second category consisted of groups where everybody was selected at least once as a friend. Findings showed that the integrated groups had generally more friend choices, more fighting partner choices, and noticeably better sociometric peer cohesion, based on pooled sociometric group level index (see Table 7). People in groups with isolates had fewer friends even though the group may have been

larger. Interestingly, groups that had significantly lower social, leadership, and intelligence test scores where not as integrated as those with higher scores.

Discussion

*Main Findings*

This analysis combined sociometric measures, questionnaire based measures, and some archival information to examine the relations between sociometric status, sociometric group cohesion, perceived primary group cohesion, and criteria like performance and attitudes about the military. Generally, sociometric findings showed that at the individual level a person's choice status was positively related to his/her perceived peer bonding in the group and rated performance (by instructors). The person's leadership status in the group was positively related to all cohesion components, perceived and rated performance, and attitudes about the military. At the group level, both *Sociometric Peer* and *Leader Bonding* indices were related to questionnaire based *Peer* and *Leader Bonding* scales. In addition to cohesion and performance, *Sociometric Leader Bonding* was associated with social, attitudinal, and behavioral criteria. Overall these findings supported the suggestion that at the individual level sociometry was significantly and positively related to group cohesion.

Having a low sociometric status in a group was significantly related to low sociability, shortage of friends in a group, having experienced hazing, mental state problems, poor physical health, a need for more doctor appointments, and less effective days in service. Nonetheless, low status people did not differ from high status people in terms of background items like age, gender, rank, mental aptitude tests, education level, grade point average at school, number of reprimands during service, and criminal record. Similarly, there also were no differences in attitudes toward a career in military, future refresher training, or national defense in general. Also, low sociometric *leader* cohesiveness indicated that there were several things wrong in a group such as poor cohesion, low-rated performance, negative attitudes, and high absenteeism, which were all related to fewer within-group leader choices.

Although the main propositions were supported by the findings, one is still left with the impression that sociometric choices are not directly and cleanly related to cohesion and performance. The finding that sociometric status is related to well-being and social factors like hazing and friendship in a group suggests that sociometry may actually be measuring the degree that the group supports people's satisfaction in a group, which in turn may have a direct relation to cohesion and performance. Therefore, future research should pay close attention to the relations between group structure, member sociometric status in a group, and member well-being before looking at their relation to main criteria like performance, satisfaction, turnover, and absenteeism.

*Challenges of Using Sociometric Measures*

Previous literature and the findings in this report suggest that sociometry is a useful method for studying individual level social reality and indicating members' social status in their group. Further, sociometry allows for an examination of group dynamics at the group level of

analysis. When sociometry is used for studying the social structure in one group without any group comparisons, there are no innate problems with this method. However, if sociometry is used to compare different groups, the group type, structure, and membership should be carefully elaborated before any further analyses. Additionally, based on the experience of the sociometric analysis in this research, certain factors may cause difficulties for making group level comparisons.

When sociometry was used to measure group cohesion, the highest validity occurred where group members made several choices for a combat group (Table 1, sociometric question 3) rather then where people selected their one best friend or fighting partner. In short, where more choices were made, the sociometric measures were more consistently related to group cohesiveness. Actually, one of the basic tenets of Moreno (1943) was that the number of choices should not be restricted, which is still good advice for measuring a variable at the group level if it is to be considered a sociometric group cohesion measure. However, without restrictions on the number of choices, it is difficult to find out the "real" best friend or the leader at the individual level of analysis. Consequently, there should be separate questions at both the individual and group level of analysis for finding both peers and leaders in the group.

Inaccuracy in comparisons of different groups' sociometric and self-rated cohesion could be introduced through several sources: a) group member background, b) group structure, c) task requirements, d) duty communication patterns, e) physical closeness during and off-duty, f) the number of squads in a platoon, and g) the level of duty interaction with other platoons. For instance, member background may cause systematic measurement "error" in some groups. The cohesion may appear artificially high if a unit is composed of people from the same hometown area, with similar abilities or hobbies, or who received the same kind of military training programs. These latent commonalities may bias comparisons with groups where people do not have such underlying common features. Conversely, in a heterogeneous group without background similarities there might be expectations for good cohesion in a group. But if there were a few people with a strong background commonality, a clique could easily form within the group, and the self-rated cohesiveness of the group overall could thereby be artificially lower despite many mutual sociometric choices. Festinger et al. (1950) also noticed this situation and concluded that subgroup formation often lowers the cohesiveness of the larger unit.

Similarly, the different structure of the group could affect the comparison between groups on their sociometric and self-rated cohesiveness. For example, the proportion of leaders in the group or females in the group may influence sociometric patterns, as will the number of subgroups or the number of people in the group (Forsyth & Katz, 1946). For instance in the current research, one group consisted of women had no ingroup choices for fighting partner (question 2) although women selected other women for their best friend choices (question 1). Similarly, squad leaders tended to select other squad leaders as their friends. Since these other leaders were outside the squad, such choices decreased squad sociometric cohesiveness, although squad perceived cohesion was good. There was a group where all members were corporals or lance corporals; that situation did not lead to a cohesive group as measured by either sociometric or self-rated measures. These group-structure anomalies decreased the level of pooled sociometric group cohesiveness, although self-perceived cohesiveness may have been high.

The specific group formation is often closely related to task requirements which in part influence communication and cooperation in and between groups. The more task performance required cooperation inside the group, the higher were sociometric cohesiveness and self-rated cohesiveness (e.g., in armored platoons). If task accomplishment involves cooperation outside the group, group cohesiveness may be lower even though the cohesiveness in a platoon may still be at a good level (e.g., combat support platoons in mechanized units). If there are a lot of individual assignments, peer cohesiveness might be low although pride in doing the job could be high (e.g., among conscripts who dealt with software or personnel issues in units). And if people are forced or allowed to cooperate with other platoons or companies, the sociometric cohesiveness will be built with them (not with their own formal squad such as in combat support and support units) which may cause lower cohesiveness in the formal group.

In addition to the above challenges in comparing groups on sociometric group cohesiveness, there are also some factors that may distort individual level choice status comparisons. For example, one exceptional person took all the possible leader choices although there were other good leaders in the group. Sometimes people selected members of other non-unit duty or informal groups, although that was not intended in the sociometry questionnaire. If there were many absent people (more than 10 percent) who did not take the questionnaire, mutual / reciprocal status choices especially were affected (see Northway & Weld, 1957). The respondents differed in how they understood the notion of "best friend" (e.g., some people selected several best friends whereas others only picked one).

There was some information that one could see in a choice matrix but that did not show up directly in the numbers, for example, if the choices were widely scattered or in a tight grouping. This kind of sociometric matrix picture can be used for an initial understanding of the data. Also one can see if there seems to be a miscalculation by visually comparing the pattern of choices with the sociometric measures. Sometimes, if the group was really small (e.g., 3-4 people), the measure of sociometric cohesiveness was better than the visual matrix pattern indicated. Based on that, it was assumed that sociometric in-group measures are not as dependable for comparisons using very small or very large groups (over 30 people), although individual choice status measures should work in these cases.

In this research, the main uncertainty in using sociometric measures was in determining the appropriate groups to compare. The discrepancy between the formal and informal groups was especially notable in some units. It is important to find out who are the real group members. For instance, it is unreasonable to ask people to select each other if they are not even members of the same platoon, if they do not feel part of that group and their social identity is not in that group, or their daily activities take place in one group but the day-off events occur in another. One good example in a military setting about inconsistencies between formal and informal groups was offered by Goodacre (1951, 1953) who discerned that sociometric choice patterns differed depending on group definition criteria (e.g., tactical, garrison, or social area or during vs. after duty hours). Jennings (1950) called the structure of social relations during leisure time as psychegroup and work-type groups as sociogroups. As a general rule, a person chooses or is with people who support one's social-emotional satisfaction during spare time while people at work tend to choose members of their group who can get the job done (i.e., based on task-related

standards; Jennings, 1977; Secord & Backman, 1964; cf. the distinction between social and task cohesion).

*Sociometry as a Research Tool*

Sociometry's main asset is that it allows gathering quantitative information that is difficult to reach in other ways. Specifically, sociometry reveals the informal structure of a group if the study design is made carefully. However, the two major drawbacks of sociometry are that a) in large scale studies, controlling intervening social factors like those discussed earlier may be difficult and that b) sociometry is truly laborious compared to other available methods. In general, in a large sample (e.g., $n > 500$), the effort needed for getting and analyzing the data on sociometric choices is out of proportion to the benefit of the results. Sociometry should seldom be used as the only research method. For instance, sociometric choice status information by itself just indicates that somebody is more popular than another in a group but does not give any basis for answering why or identifying the roles and positions occupied in the group (Hare, 1962). Although a sociogram gives a snapshot of the informal structure in a unit, more reliability is achieved by conducting a follow-on study that allows the researcher to assess the consistencies in the sociometric choices.

Still, in qualitative research where the focus is on one unit, school, company, or other organization, sociometry might be useful for pointing out social relations in and between groups. By combining observation, interviews, and essays with sociograms and sociometric measures, a researcher can create an extremely detailed picture about an organization (more in Jennings, 1977; Northway & Weld, 1957). Sociometry's main benefits can be seen in studies that try to classify groups and their members (Kerlinger, 1986) because it easily finds different positions in a group like informal leaders, cliques, or isolates. Sociometry may even display the paths along which information and opinions might travel (Festinger et al., 1950), and by whom people are influenced. In all, sociometric method is at its best when it is used with other methods for studying informal group structure and its affect.

*Sociometry as a Tool for Supporting Group Dynamics*

Since the one consistent finding of sociometric literature is that the pattern of sociometric choices can show the informal group structure in a unit (Festinger et al., 1950; Hare, 1962), information on that informal structure could be used for reorganizing groups to support communication and better working relationships, which should increase people's satisfaction and the productivity of the unit (Secord & Backman, 1964). First, it is useful to identify the "real" leaders or people who are capable of acting as leaders (or supporting the formal leaders). Second, people who are friends in a group could be allowed to work with each other (if that does not lead to a formation of unproductive norms or cliques). Third, people who dislike each other should not be assigned to work with each other. Negative relations could be determined by asking "Whom would you reject from the group if you could choose?" (Hare, 1962; Kerlinger, 1986). Sociometry is especially useful if the group has social problems (if there are many isolates or rejected people) because it identifies the "hurting points" (i.e., difficulties between certain people). Fourth, people who are not selected at all or who are often rejected should be assigned to work with a person with whom they would like as a friend (if that person has not already

rejected the "rejected one"). Fifth, people who interact more with members of another group and who receive choices from that group (indicating informal membership in that group) could be moved to live with them (e.g., at the same barrack room) or work with them if appropriate. Finally, cliques should be broken up by relocating people when the clique formation leads to a decrease of cohesion in the whole group and/or dysfunctional norms inside the clique against the group or unit.

In the military, higher leaders are able to refine the group formation and assign some people to more suitable tasks. For instance, changes could be made well before an upcoming field exercise, and people's responses to the change could be compared (e.g., comparison to performance and attitudes before the intervention). Correspondingly, sociometric choices could be used in planning group formation for a deployment or for the group structure in reserve units. In brief, by using sociometry, the leader or instructor of the group can plan daily activities and day-off physical conditions for supporting both the group and the unit. Overall, carefully planned and conducted sociometry may be a useful method for social psychological research and for understanding group structure in practice.

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